

# Interlocking Pieces: The Environment

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# Water Resources

## PRINCIPLE

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Water resources provide drinking water, recreational opportunities, and environmental benefits, and should be protected and used appropriately.

## Water Resources

Not long ago water seemed like an inexhaustible resource, but sufficient water of a quality and quantity to serve human needs is becoming an increasingly scarce commodity worldwide. While some aquatic systems exhibit a remarkable resilience to disruption, others are vulnerable to small incremental changes that can undermine their benefits to our community.

Tompkins County is blessed with diverse water resources that provide for the domestic, commercial, and recreational needs of the community, and are necessary for the survival of many plants and animals locally and regionally. Tompkins

Groundwater, surface water, and wetlands do not function as separate systems but are part of an interconnected whole.

County is a major contributor to the Cayuga Lake watershed, with about 80 percent of Tompkins County's water draining north into the Finger Lakes and eventually into Lake Ontario, and 20 percent draining south to the Susquehanna River and eventually into the Chesapeake Bay.

The three major categories of water resources are surface water, groundwater, and wetlands. Surface water consists of streams, creeks, lakes, and ponds. Groundwater is water that is stored in the underground spaces between deposits of sand, gravel, and silt, and in the cracks in bedrock. Groundwater deposits that can be expected to yield significant quantities to wells are called aquifers. Areas where surface water infiltrates into these aquifers are called recharge areas and are particularly important to the protection of groundwater quantity and quality. Wetlands include land areas that are inundated with water year-round, as well as areas that are dry for part of the year but collect water seasonally. Wetlands and riparian areas (lands associated with streams and rivers) are important because they temporarily store floodwaters, filter pollutants from surface waters, control erosion and sediment, supply surface water flow and recharge groundwater supplies, and provide habitat for fish and wildlife. Tompkins County contains about 20,000 acres of identified wetlands.

These three major classifications of water resources are distinct parts of a larger interconnected water resources system and should be considered and managed as a system. The United States Geological Survey has recently determined that approximately 60 percent of the flow in surface water streams in central New York originates from groundwater resources.

## Drinking Water Supplies

Surface water provides drinking water for approximately 55 percent of Tompkins County residents. Three water treatment facilities in the county rely on surface water. Bolton Point, operated by the Southern Cayuga Lake Intermunicipal Water Commission, draws its water from Cayuga Lake; the Cornell Water Filtration Plant draws from Fall Creek; and the City of Ithaca Water Treatment Plant uses water from Six Mile Creek.

Groundwater is the source of drinking water for approximately 45 percent of county residents, including those with individual wells or on one of five municipal drinking water systems that rely on groundwater, and over 170 small private systems.

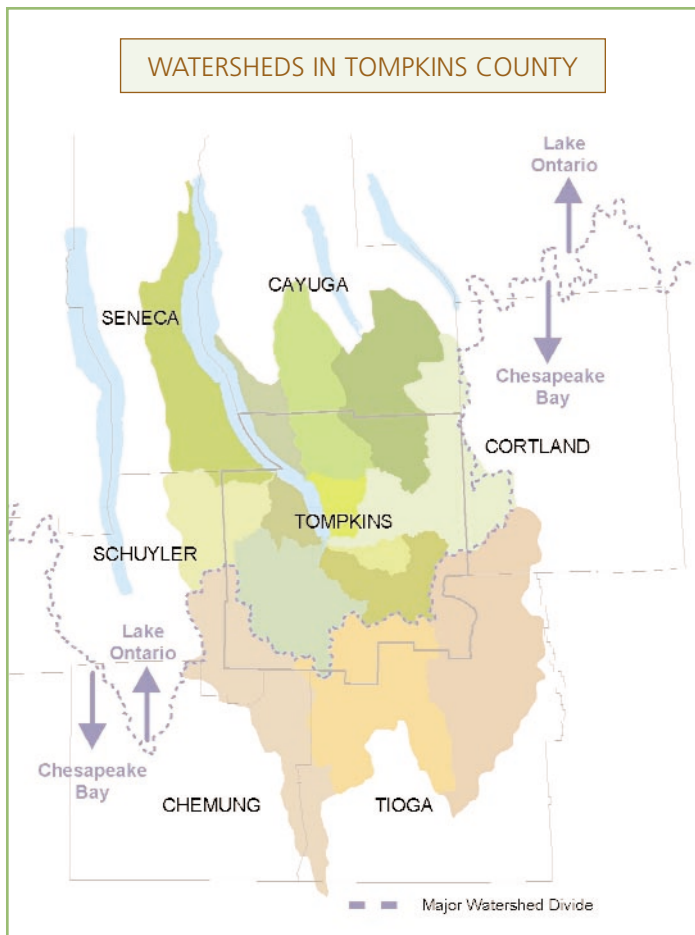
The amount of available drinking water is primarily an issue in rural areas of the county that obtain drinking water from groundwater. As more homes and businesses are built in these areas, they are supported by new wells withdrawing more water from the aquifers. In some parts of the county new wells can noticeably decrease the supply of water from wells in nearby areas.

Drinking water quality, however, is an issue countywide. Some of our water supplies are threatened by the potential contamination of an entire aquifer or water body that

Studies to determine the extent of our aquifers and define their recharge areas are critical to the protection of these resources.

can result from a single accidental chemical spill or leaking fuel storage tank. Another potential threat to drinking water supplies is aging, inadequately sized, and improperly managed individually-owned septic systems. Currently, individually-owned septic systems serve approximately 40 percent of all households in Tompkins County.

Land uses and facilities that pose the greatest threats should be located away from areas that contribute to drinking water supplies. Studies to determine the extent of our major surficial aquifers and define their recharge areas are critical to the protection of these resources and should be continued.



Sources: U.S. Geological Survey; Tompkins County Information Technology Services

## Threats to Water Quality and Quantity

Many of the threats to water quality in Tompkins County come from more dispersed, "non-point" sources. Since 1969, low-density development in the county has increased by 10,000 acres and the amount of impervious surfaces has increased by nearly 1,000 acres. These changes, the associated increase in non-point source pollution, and the intensification of land use have led to increased erosion and sedimentation, loss of wetlands and riparian areas, greater amounts of stormwater runoff and pollutants carried by the runoff, as well as an increase in flooding. Other impacts of increased rates of stormwater runoff include accelerated channel erosion and alteration of streambed composition, which can dramatically degrade aquatic habitats. A New York State Department of Environmental Conservation water quality study found that from 1992 to 2002, water quality throughout New York State declined, attributable in large part to changes in land use and the intensity of land use.

Similar threats to water quality throughout the United States have prompted the Environmental Protection Agency

(EPA) to promulgate the Phase II stormwater regulations. These regulations require all construction projects that disturb more than one acre to implement practices to minimize erosion and, in some cases, monitor runoff. The EPA regulations also require certain municipalities to develop regulations and management plans to help manage stormwater.

In Tompkins County, the impacts of land use change on water resources culminate primarily in Cayuga Lake. The shallow southern end of Cayuga Lake is inherently more vulnerable to pollution than other, deeper portions and suffers from a number of water quality problems including elevated sediment and phosphorous levels, algae blooms, odors, and elevated levels of coliform bacteria. Low levels of agricultural chemicals have also been detected in the lake.

The loss of wetlands that once acted as sediment traps, as well as streambed and streambank erosion, contribute

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to sedimentation in the southern end of Cayuga Lake. Though sedimentation is often related to changes in land use, construction, and land management practices, it can also result from natural geological processes. An assessment of the Six Mile Creek watershed, revealed that much erosion and sedimentation in that watershed could be directly attributed to natural processes.

## Stormwater Runoff and Flooding

Increased stormwater runoff has a significant impact on floodplain management. As land area is converted to more urbanized uses, the amount of impervious surface associated with that land use generally increases, causing a reduction in groundwater replenishment and increased non-point source pollution and flooding. This increases both the frequency and magnitude of flood events. Flooding and stormwater runoff concerns are exacerbated in many parts of Tompkins County because of the steep slopes and glacially-dominated soils that do a poor job of absorbing runoff during heavy rains or snowmelt. Major storm events occur relatively frequently, and the capacity of our many streams can be quickly overwhelmed.

Population centers that are clustered in valleys and along the shores of creeks are particularly vulnerable to repetitive flooding. Many of Tompkins County's manufactured homes are located in designated floodplains, increasing the vulnerability of these residents to flood events.

## Waterfront

We are fortunate in Tompkins County to have approximately 26 miles of shoreline along Cayuga Lake, a magnificent environmental, recreational, social, and economic resource. The shoreline of the lake is dominated by recreational and residential land uses. Several prominent parks are located along Cayuga's shores: Taughannock Falls State Park, Lansing Town Park at Myers Point, Stewart Park, and Cass Park. Much of the remainder of the shoreline outside the City of Ithaca is characterized by residential development.

In addition, the waterfront is home to businesses and utilities that depend upon or are related to the lake. Facilities such as marinas, boat rental services, boathouses, and the like, are absolutely dependent on a waterfront location. Many utilities are also dependent upon a location on or near a water body. Examples in Tompkins County include wastewater treatment facilities in the City of Ithaca and the Village of Cayuga Heights, Bolton Point Water Treatment Plant, AES Cayuga power plant, and the Cornell Lake Source Cooling heat exchange facility.

Some businesses, while not dependent on a waterfront location, are strongly linked to and benefit greatly from

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a location on the waterfront. Restaurants, hotels, and water-related attractions can help draw tourists to the waterfront.

The City of Ithaca's waterfront, along Cayuga Inlet, offers a tremendous opportunity to develop an urban waterfront experience for both residents and tourists alike. Recent and ongoing efforts to enhance this waterfront include the Inlet Island Promenade; the Cayuga Waterfront Trail – which will eventually connect the Visitors Center to Cass Park – and relocation of the New York State Department of Transportation's Maintenance Facility.

## Policies

**It is the policy of Tompkins County to:**

- Promote appropriate development of waterfront lands for water-dependent or water-enhanced uses, including enhancing public access to Cayuga Lake.
- Protect water quality and quantity in the county's streams, lakes, and groundwater.
- Protect drinking water supplies from contamination.
- Protect stream corridors, wetlands, and land areas that are seasonally inundated by water.

## Action Items

*Action items are short-term activities that Tompkins County government or community partners can undertake to implement the long-term policies.*

- ➔ Complete watershed assessments for the Fall Creek and Six Mile Creek drinking water sources.
- ➔ Continue to conduct aquifer studies.
- ➔ Initiate inspection and maintenance requirements for individual on-site wastewater treatment systems.
- ➔ Update the county flood hazard mitigation program to incorporate watershed-based approaches to reducing the risk of flood damages.
- ➔ Update floodplain maps.
- ➔ Develop or identify model stream buffer ordinances.
- ➔ Develop a system to provide for regular maintenance of existing drainage systems and use of appropriate road ditching techniques on County-maintained roads, and encourage the use of such techniques on other roads in the county.
- ➔ Develop boat docking, boat service areas, and a waterfront commercial district on, and in the vicinity of, Inlet Island in the City of Ithaca.
- ➔ Redevelop the NYSDOT Maintenance Facility site with water-dependent and/or water-enhanced projects to provide economic benefits to the City and the County and provide public access to the water's edge.
- ➔ Dredge Cayuga Inlet and find an appropriate method for disposal of dredge spoil material, for example, using dredged material to create new, functioning wetlands at the south end of Cayuga Lake.
- ➔ Prepare a Cayuga Lake water quality and quantity monitoring plan.





## N a t u r a l   F e a t u r e s

### PRINCIPLE

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Natural features that define our community, and form the foundation of our local and regional ecological systems, should be preserved and enhanced.

## The Need for Preservation

Tompkins County is known for its resplendent landscapes and natural havens. Both local residents and visitors enjoy and appreciate Cayuga Lake; the many gorges, streams, and waterfalls; and our rolling farmland, fields, and wooded hillsides. In fact, we are living in a landscape that became more diverse during the twentieth century with the return of forests in the southern parts of the county and the preservation of significant tracts of our most valued natural areas as parks, state forests, and preserves. In contrast, in the latter part of the twentieth century sprawling development started to adversely impact these natural features.

Increasing rates of land development threaten to fragment the landscapes we cherish, calling into question the

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consequences of land use policies that do not include a long-term goal of sustainability. For example: Will our existing natural areas be degraded by encroaching development? Will the return of native wildlife such as river otters, wild turkeys, beavers, and bald eagles continue? Will the scenic views we take for granted as part of our quality of life be marred by inappropriate development?

If we wish to continue to enjoy these features of our community, we need to take action to protect them. Conservation efforts should be determined through public education, development of protection plans, and public/private partnerships. Sustaining profitable and functioning landscapes will be key to protecting these areas over the long term.

## Our Natural Bounty

A recent study of tourism in Tompkins County, conducted for the Convention and Visitor's Bureau, found that visitors ranked beautiful scenery and waterfalls, and outdoor activities among the features of Tompkins County they liked the most. In addition to a vast number of streams, gorges, waterfalls, lakes, forests, and wetlands, the county also has four state parks, nearly 39,000 acres of protected natural areas, and miles of hiking and multi-use trails.

Central to Tompkins County's beauty and character is Cayuga Lake. The Cayuga Lake valley's spectacular topography, with steep slopes to the east and west and a relatively

flat drainage basin to the north, was carved by periods of glacial advance and recession.

Although Cayuga Lake provides a variety of recreational opportunities for Tompkins County residents and visitors, lake access is somewhat limited. Boating facilities at the southern end of the lake are available at Allan H. Treman State Marina and Taughannock Falls State Park on the west side, and at Noah's Marina and Myers Point Municipal Park on the east side. Swimming is limited to Taughannock Falls State Park and Myers Point, although prior to the 1960s there was also a swimming beach at Stewart Park in the City of Ithaca. Hiking and biking amenities along the lake have improved dramatically in recent years, in particular with the development of the Waterfront Trail in the City of Ithaca.

Wetlands provide flood protection and abatement, erosion and sedimentation control, water quality maintenance, groundwater recharging, surface flows maintenance, fish and wildlife habitats, nutrient production and cycling, recreation, open space, education and scientific research opportunities, and biological diversity. There are nearly 20,000 acres of wetlands in Tompkins County identified in the National Wetlands Inventory. The New York State Department of Environmental Conservation has regulatory authority for more than 5,000 of these acres.

Tompkins County is crisscrossed with creeks and streams, from major waterways to seasonal rivulets whose music fills our woods. Major creeks include Salmon Creek, Cayuga Inlet, Six Mile Creek, Cascadilla Creek, Fall Creek, Owasco

**Central to Tompkins County's beauty and character is Cayuga Lake.**

Inlet, Owego Creek, Catatonk Creek, Cayuta Creek, and Taughannock Creek. There are also more than 40 additional named perennial streams, as well as numerous intermittent streams. These stream corridors provide important habitat benefits, promote biodiversity, and connect pockets of open space. Vegetated stream buffers also provide important water quality functions, such as filtration and erosion control.

The Unique Natural Areas (UNAs) of Tompkins County are sites with outstanding environmental qualities deserving of special attention for preservation and protection. The 192 designated Unique Natural Areas are found in gorges, woods, swamps, fens, cliffs, and along streams. They are located throughout the county and range in size from less than an acre to more than 4,000 acres.



Greenways provide connecting links between large tracts of existing protected open space. They are intended to meet the needs of wildlife (both plants and animals) for habitat dispersal, breeding, and migration. The 90 square miles of greenways, identified by the Tompkins County Greenway Coalition in 1995, form the basic components of a biological corridor system.

The National Audubon Society, with the support of the American Bird Conservancy, initiated the New York Important Bird Areas (IBAs) program in the Spring of 1996. They identified areas based on the concentration of birds, the presence of endangered, threatened or special concern bird species, the type of habitat, and the use of the site for avian research. Four of the 127 identified Important Bird Areas in New York State are located in Tompkins County.

Tompkins County has nearly 200 miles of hiking and multi-use trails. This includes the Finger Lakes Trail, park trails, trails in state forests, Cornell trails, and trails on nature preserves. In addition, the 1995 Greenways Plan identifies a number of corridors in Tompkins County with potential for future trail development. The future trail corridors were identified based on the location of abandoned railroad beds, the location of population centers, and the potential for connecting existing trails and natural areas.

### Existing Protected Open Space

Protected open space includes natural areas such as state lands, Finger Lakes Land Trust preserves and conservation easements, Nature Conservancy preserves, and county reforestry lands, as well as other types of open space such as municipal parks, county airport clear zones, and cemeteries. Many natural resources – such as wetlands, greenways, bird areas, and areas of unique plant and animal species – are located in these protected areas. In addition, many of these are open to the public and provide important recreation opportunities.

Four state parks serve as recreational focal points in the county, drawing visitors from throughout the region. The planned Black Diamond Trail, which will connect these four parks along an abandoned rail corridor, will greatly enhance the recreational opportunities associated with the parks. Unfortunately, state parks in the county are also increasingly affected by development. The swimming areas at Treman and Buttermilk Falls State Parks have periodically reported elevated levels of bacteria and turbidity, which may impair the long-term viability of swimming at these popular sites. In addition, noise, light pollution, and viewshed impacts associated with development threaten the outdoor experi-

### PROTECTED NATURAL AREAS

*As of August 4, 2004*

Owner	Acres
New York State	27,801
Cornell University	6,528
Finger Lakes Land Trust	2,609
City of Ithaca	1,071
Tompkins County	654
The Nature Conservancy	393
Private/other	75
Other local municipalities	30
<b>TOTAL</b>	<b>39,161</b>

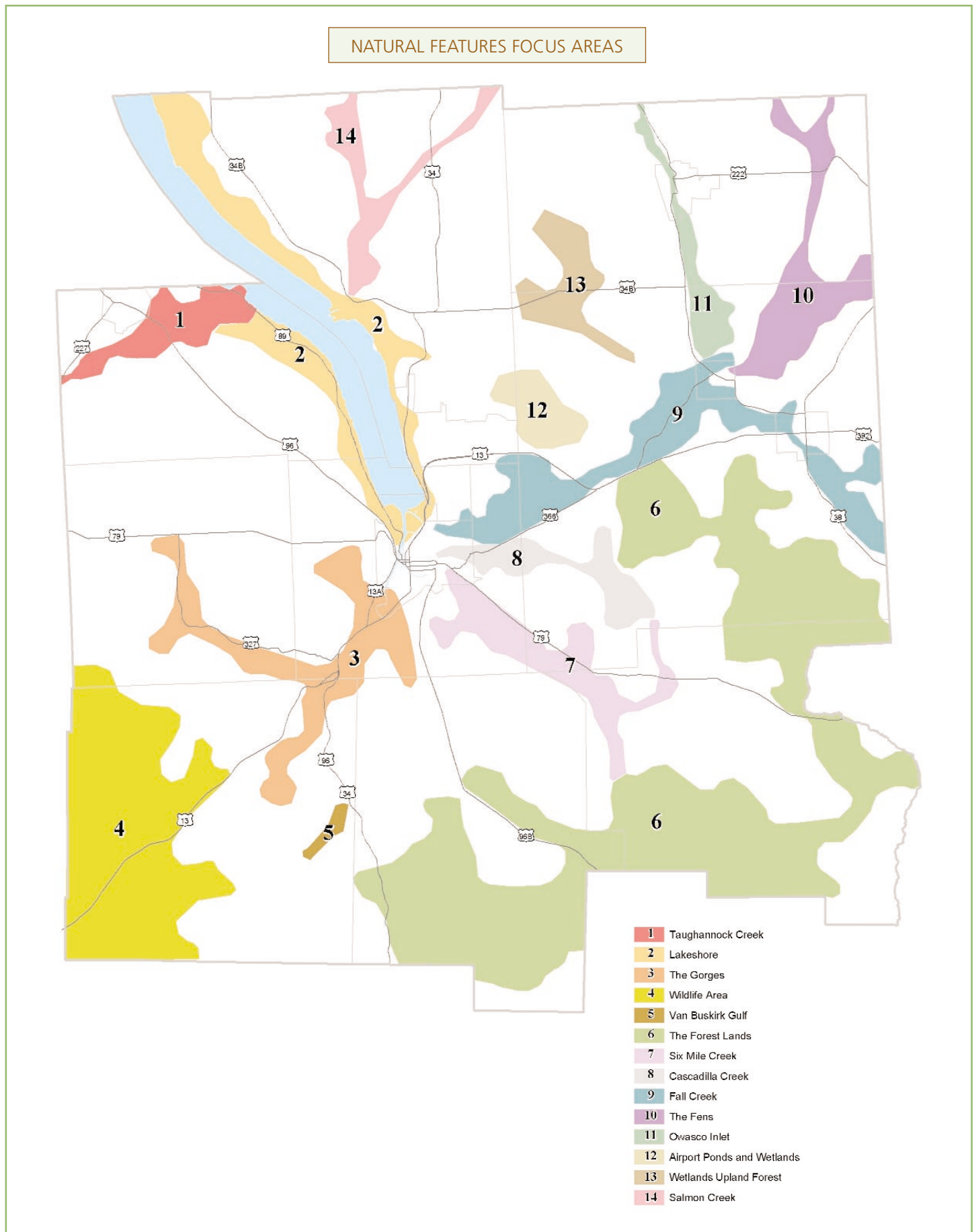
Source: Tompkins County Planning Department

ence that makes these parks so special. At risk is not only the enjoyment of these parks by members of the community, but also the appeal of these locations as tourist destinations.

Lands already protected by ownership provide an important framework for future protection efforts. Enhancing these areas through further protection of surrounding lands will help create a “critical mass” of interconnected open space that will promote habitat connections, sustain agriculture, protect water quality, ensure the health of wildlife populations, and provide outdoor recreation opportunities for generations to come.

### Natural Features Focus Areas

Good land stewardship, and the strong connection between landowners and their lands, provides a foundation for long-term preservation of the natural resources we value. Individual efforts, however, cannot fully address the need for community-wide open space preservation. Successfully preserving open space and its various functions requires a coordinated effort that spans across property lines and municipal boundaries. Identifying areas in the county to focus our efforts will help achieve this goal.



Source: Tompkins County Planning Department

## NATURAL FEATURES FOCUS AREAS

<b>Taughannock Creek</b>	3,000 acres	About 25 percent is located in Taughannock Falls State Park. Resources include Taughannock Creek, a biological corridor, small wetlands, UNAs, a portion of an IBA, a portion of the Black Diamond Trail, and waterfront access.
<b>Lakeshore</b>	9,000 acres	This area surrounds the most significant natural focal point of Tompkins County. Resources include a large biological corridor, an IBA, numerous stream corridors, and important wetland clusters, waterfront access, and trail corridors.
<b>The Gorges</b>	8,000 acres	Three spectacular gorges include hanging cliffs with substantial waterfalls. Almost 40 percent of the area is protected by ownership, largely by inclusion in Buttermilk Falls State Park and Treman State Park. Resources include UNAs, wetlands, a biological corridor, a municipal well, a portion of the Finger Lakes Trail, and trails in the state parks.
<b>Wildlife Area</b>	16,000 acres	There is very little development in this area, particularly outside the Route 13 corridor. The area is predominantly forested, with agricultural lands in the valley. About 60 percent is already protected as open space. Resources include a biological corridor, an IBA, UNAs, wetlands, perennial streams, significant sections of the Finger Lakes Trail, and two potential trail corridors. The area is home to a growing population of black bears.
<b>Van Buskirk Gulf</b>	400 acres	This area is small but significant for the natural features it possesses. Resources include a high-ranking UNA which accounts for more than half the focus area, Chaffee Creek, and a potential trail corridor.
<b>The Forest Lands</b>	40,000 acres	This crescent-shaped area includes four state forests. More than half the area is protected by ownership. Resources include UNAs, portions of several biological corridors, multiple creeks, wetlands, and an extensive trail network.
<b>Six Mile Creek</b>	5,000 acres	This area is defined by Six Mile Creek and its perennial tributaries. Almost 30 percent is protected by ownership, primarily as part of the City of Ithaca Six Mile Creek Natural Area and watershed protection area. Resources include an extensive biological corridor, UNAs, wetlands, and existing and potential trail corridors.
<b>Cascadilla Creek</b>	3,000 acres	Almost 50 percent of this area is protected open space. Resources include a biological corridor, wetlands, UNAs, East Hill Recreation Way, Ellis Hollow Nature Preserve trails, and the Cornell Plantations Cascadilla Creek trail. These trails provide recreation as well as transportation connections between downtown Ithaca, Cornell, and outlying population areas.
<b>Fall Creek</b>	9,000 acres	Almost 25 percent of this area is protected by ownership. Resources include an IBA, wetlands, UNAs, a biological corridor, potential trail corridors, and an existing trail network that includes Cornell Plantations trails, Dryden Trail, Freeville Trail, and the Dryden Lake Park Trail.
<b>The Fens</b>	5,000 acres	This area includes numerous and extensive fens, which are designated as a National Natural Landmark. The fens, many of which are part of UNAs, are scattered along the stream corridors. Additional resources include a biological corridor and the proposed Lime Hollow Trail.
<b>Owasco Inlet</b>	2,000 acres	This focus area currently has no land protected by ownership. Resources include a biological corridor, wetlands, and a UNA. A potential trail extends along an abandoned railroad grade from the Village of Freeville past the Village of Groton.
<b>Airport Ponds and Wetlands</b>	2,000 acres	More than a third of this focus area is protected by ownership by inclusion in the Cornell University Natural Areas. Resources include a number of large wetlands and UNAs.
<b>Wetlands Upland Forest</b>	3,000 acres	Fifteen percent is protected by ownership. Protected lands include a large upland farm that provides a connecting link between the clusters of low-lying wetlands that define this focus area. Other resources include a biological corridor along Mill Creek, and several UNAs.
<b>Salmon Creek</b>	3,000 acres	Only about 50 acres of this area are currently protected by ownership, mostly as a Finger Lakes Land Trust Nature Preserve. Resources include an IBA, a biological corridor, wetlands, and a UNA.

Tompkins County has been proactive in identifying and mapping many of the natural resources in the county. Based on the location and concentration of those resources, such as Unique Natural Areas, wetlands, stream corridors, public drinking water resources, Important Bird Areas, and hiking and multi-use trails and trail corridors, the County Planning Department has identified 14 distinct and significant Natural Features Focus Areas, ranging in size from 400 to 40,000 acres.

### Benefits of Preserving Open Space

Open space provides a variety of important quality of life functions including the health benefits of outdoor recreation and general enjoyment of the natural beauty and scenic views. These amenities can contribute to the local economy by increasing property values and tax revenues, attracting tourists, and ensuring the continuance of agriculture and other unique working landscapes. A case study of town-houses in Tompkins County found that views of “ecological greenspace,” defined as some type of protected natural area, increased the property value. This was also true for properties near Cayuga Lake, major creeks, and state parks.

Open space also supports valuable environmental processes such as protecting significant types of habitat and enhancing critical environmental processes such as water filtration, recharge of groundwater resources, and climate control.

## Policies

Tompkins County has been proactive in identifying many of the natural features we value, through the Unique Natural Areas Inventory, Building Greenways for Tompkins County, and the Tompkins County Agricultural Lands and Natural Areas Feasibility Study. The identified Natural Features Focus Areas indicate where conservation efforts should be applied through public education, the development of protection plans, and public/private partnerships.

### It is the policy of Tompkins County to:

- Preserve the natural features, ecosystems, and forest lands within the Natural Resources Focus Areas identified in the Comprehensive Plan.
- Preserve and protect scenic views, areas of natural beauty, and the rural character of Tompkins County.
- Protect the ecological, economic, and recreational functions and beauty of Cayuga Lake.
- Preserve and enhance existing parks, hiking trails, active and passive recreation facilities, and historic resources, and foster the creation of new recreational amenities.

## Action Items

*Action items are short-term activities that Tompkins County government or community partners can undertake to implement the long-term policies.*

- ➔ Establish an open-space program to protect or preserve natural resources and recreational amenities in the focus areas identified in the Comprehensive Plan using tools appropriate to the functions of those resources.
- ➔ Define stream corridor buffers for the major tributaries to Cayuga Lake and encourage use of appropriate measures to preserve the designated stream corridors.
- ➔ Develop and disseminate educational information tailored to each Natural Features Focus Area and each Agricultural Resources Focus Area.
- ➔ Conduct a Scenic Resources Inventory and prepare a Scenic Resources Preservation Plan.
- ➔ Develop or identify model performance standards to preserve natural resources.
- ➔ Develop or obtain a system to track land use changes and preservation efforts.
- ➔ Complete the Cayuga Waterfront Trail and the Black Diamond Trail.